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H1N NBG NDP N263 N276 N279 N297 N543 N588  
N608 N626 N631 N637 N704 N74X N838  
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(56) Documents Cited

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(58) Field of Search

UK CL (Edition T ) H1N NBG NDP

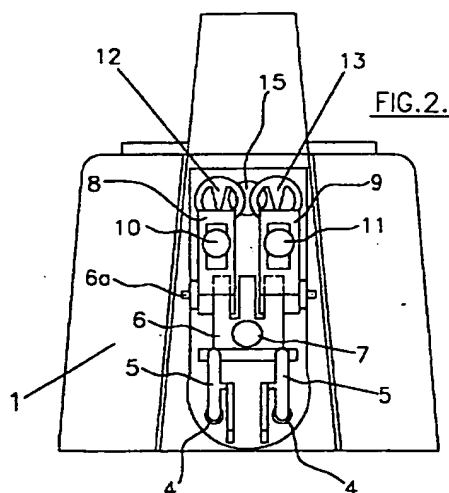
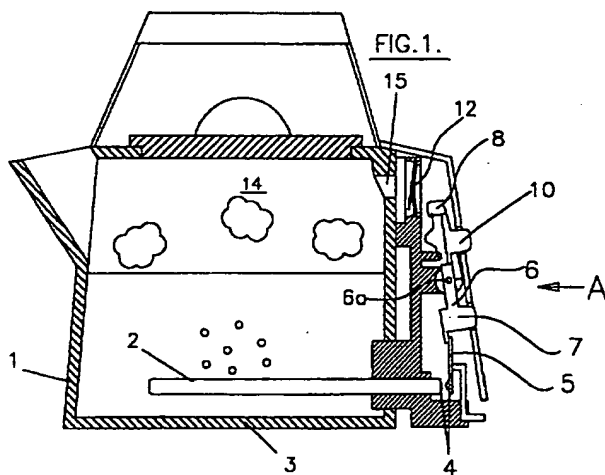
INT CL<sup>7</sup> H01H

Other: Online: WPI, EPODOC

(54) Abstract Title

Kettle

(57) A kettle has a container 1 for water with an electric heating element 2 at the base 3 of the kettle. The element 2 is connected to an electric supply through two pairs of switch contacts 4. A toggle arrangement 5 and rocker arm 6 couples the switches 4. Associated with the rocker arm 6 are two separate activating arms 8 and 9. Each arm 8 and 9 has a separate bi-metallic element 12 and 13 in communication with the interior head-space 14 of container 1 via an aperture 15. The button 10 sets the bi-metallic mechanism 12 for "hot" and the mechanism then trips at a lower temperature. The button 11 sets the bimetallic mechanism 13 for "boil" and the mechanism then trips at the higher temperature corresponding to boiling of the water. A user may select either "boil" or "hot" according to need. Alternatively only one bimetal may be used, with a slidable apertured plate varying the actuation point thereof.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

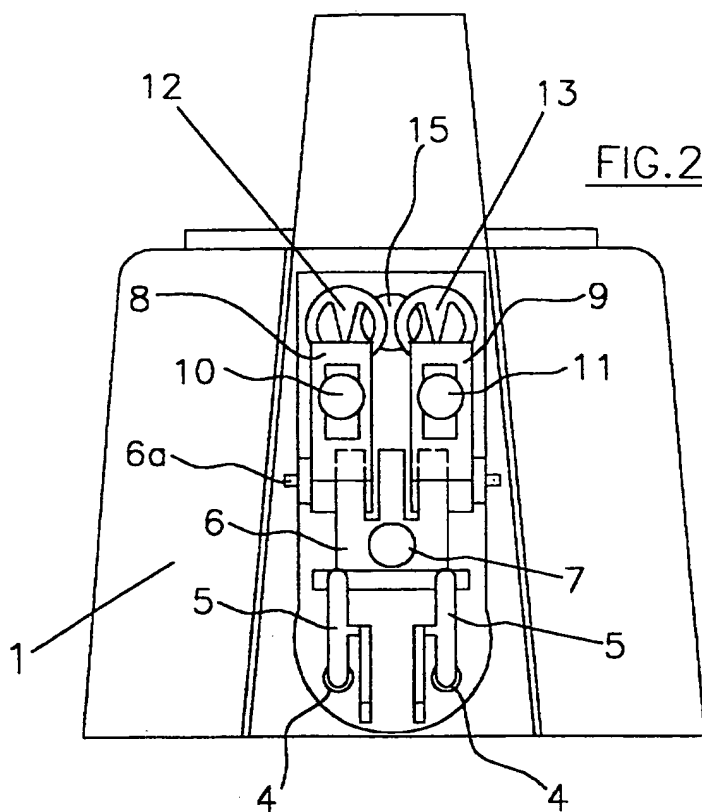


FIG.2.

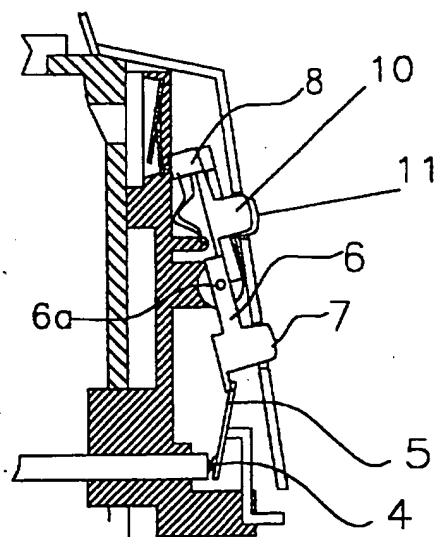


FIG.3.

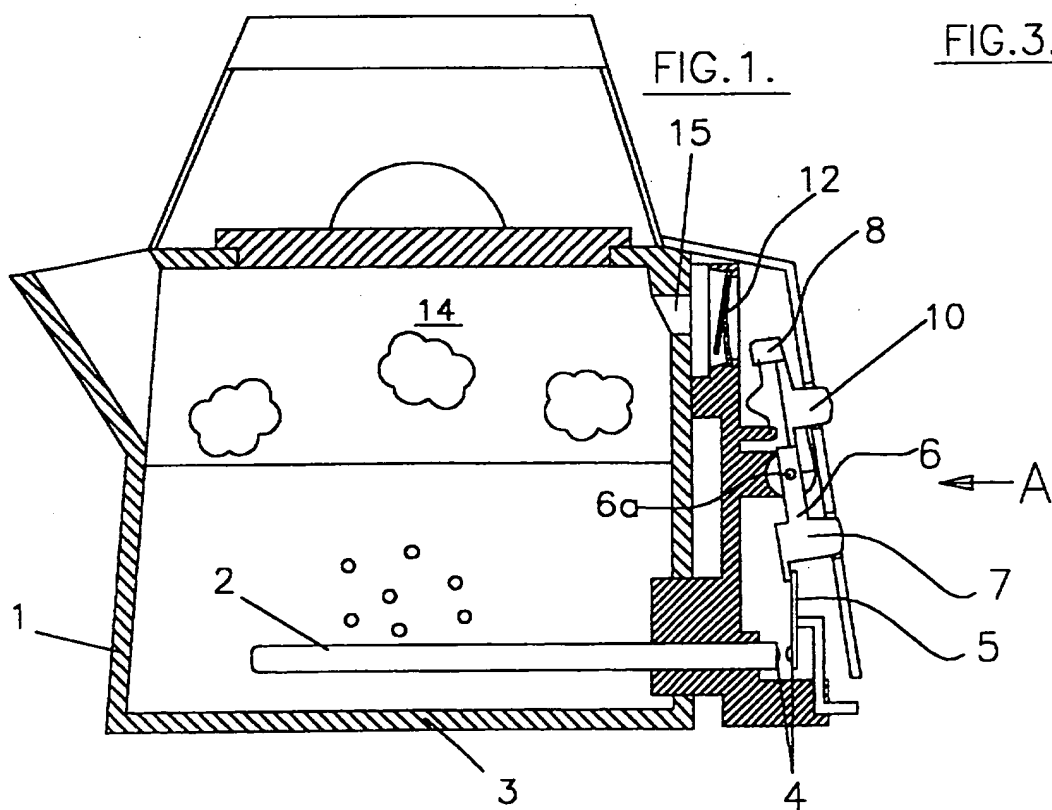
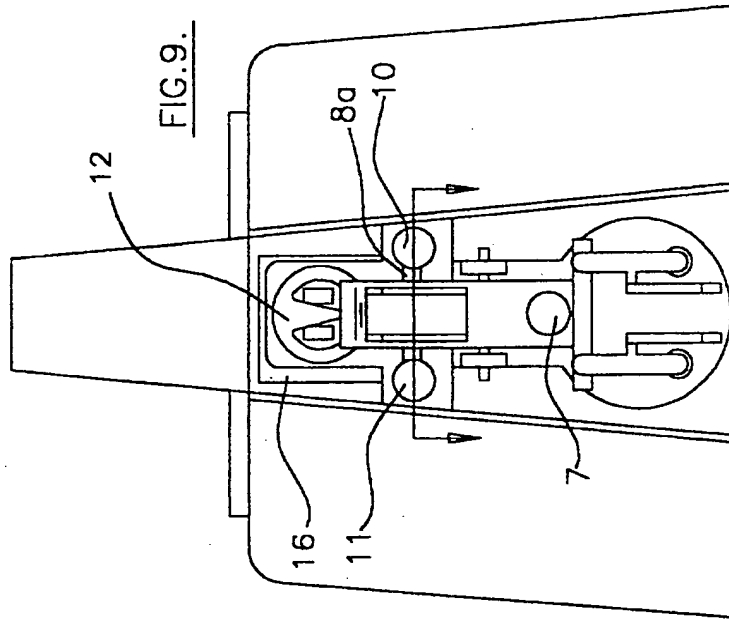
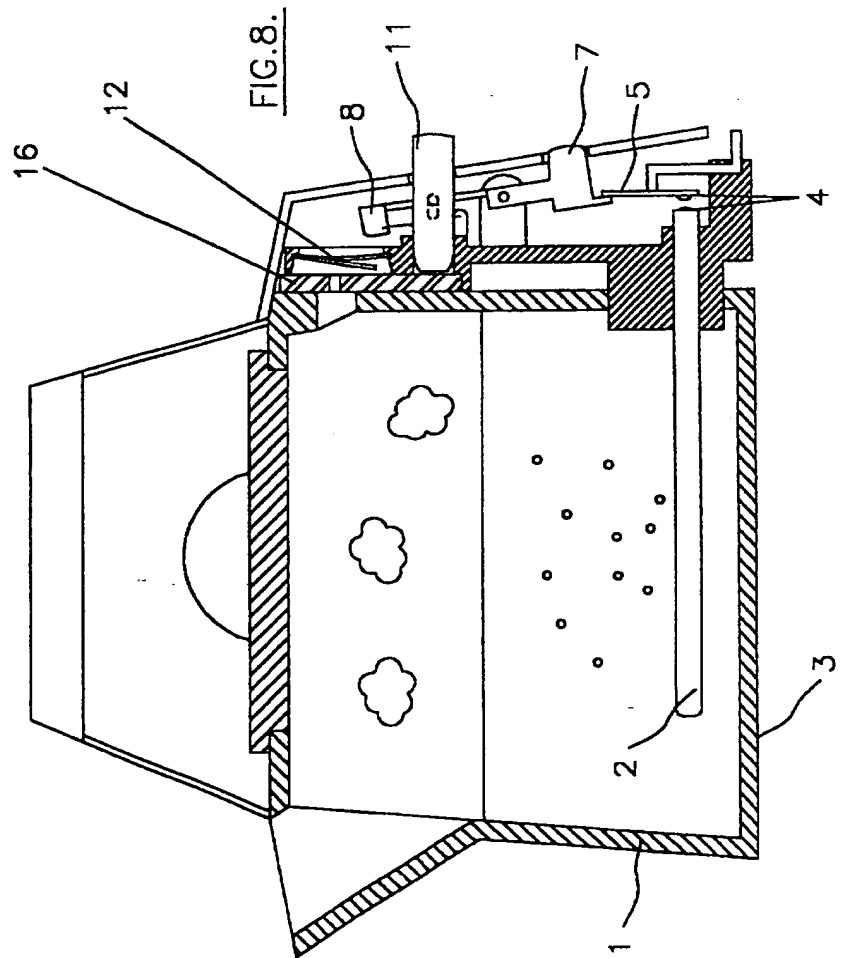


FIG. 1.





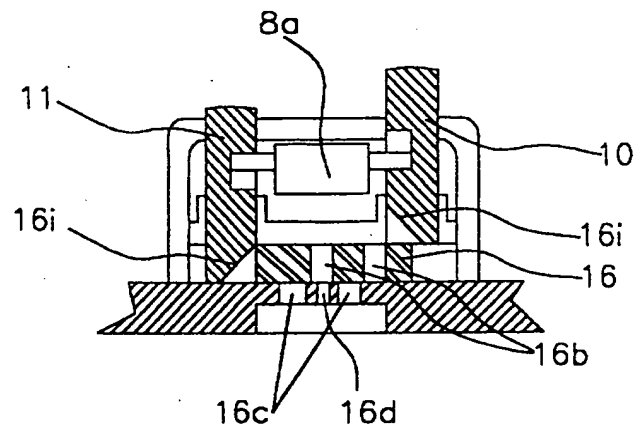


FIG.10.

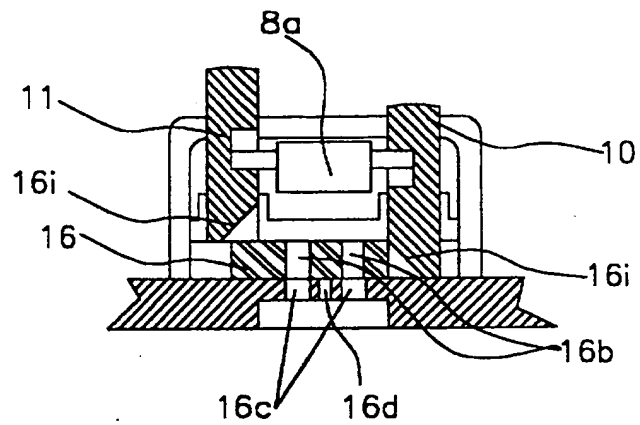


FIG.11.

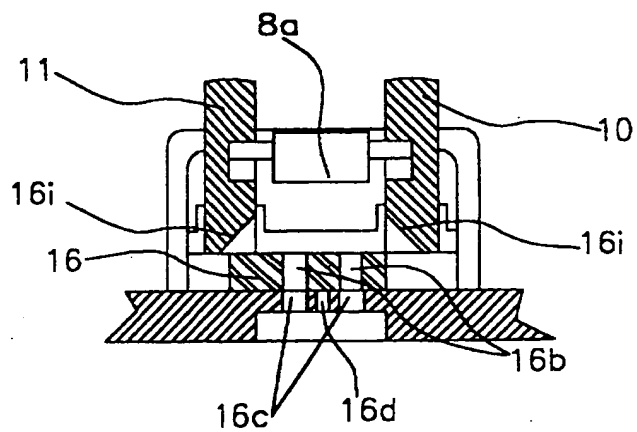
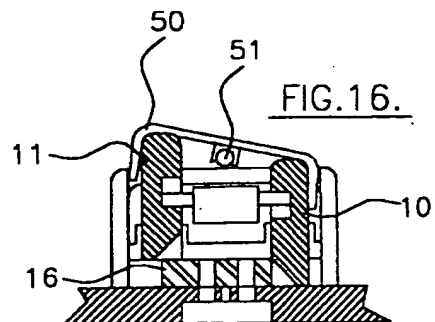
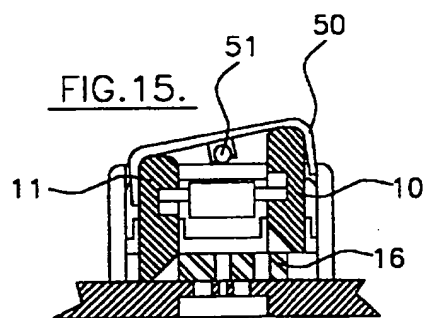
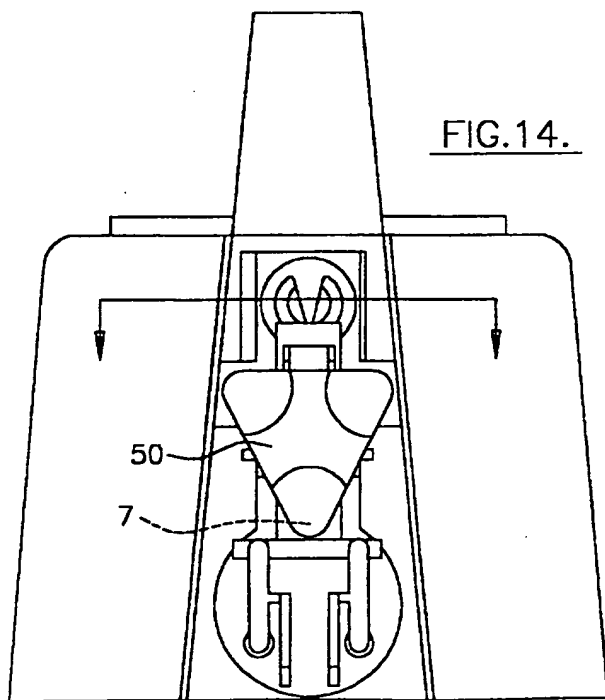
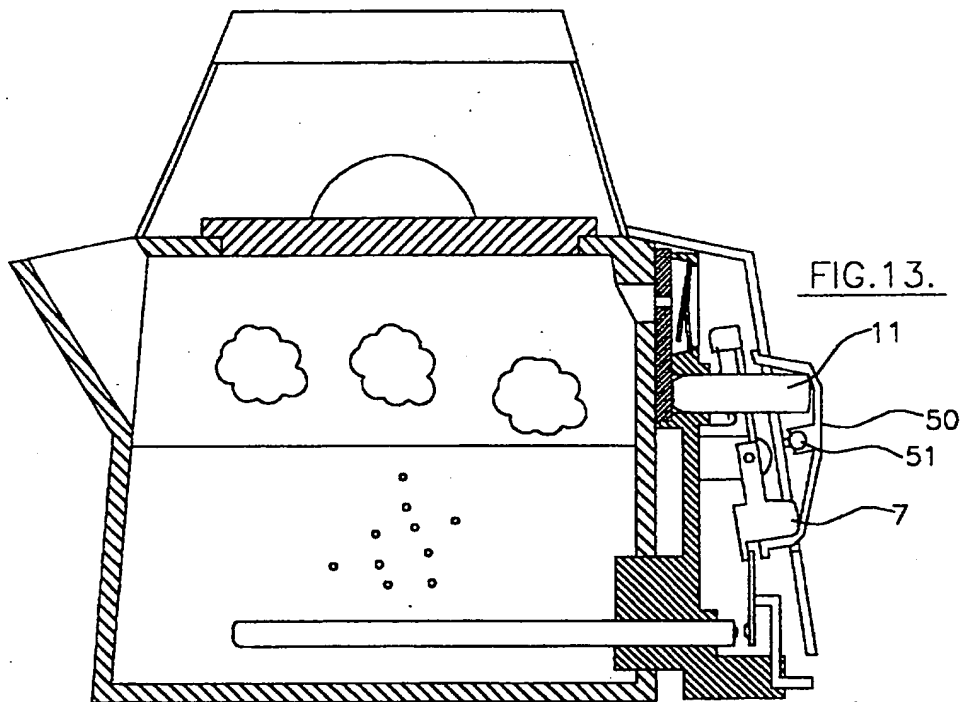


FIG.12.



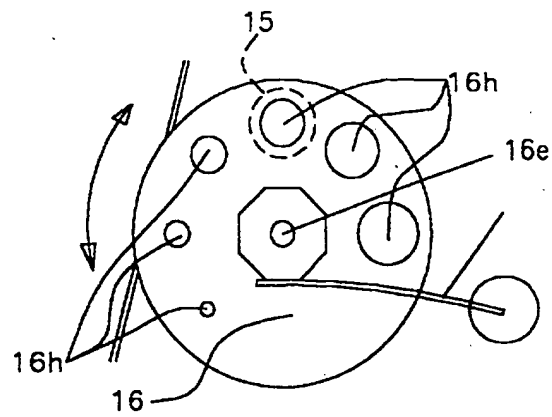


FIG. 17.

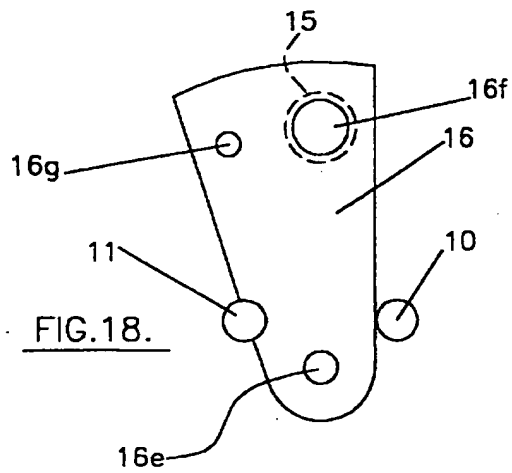


FIG. 18.

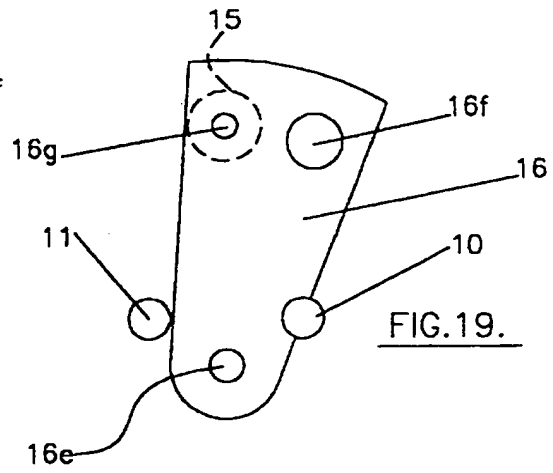


FIG. 19.

**Title:**

**Electric Kettle**

This invention relates to an electric kettle and more particularly to a means for  
5 sensing the water temperature and switching-off the kettle at a pre-selected  
temperature.

Electric kettles, particularly domestic types of the kind to which this  
invention principally relates, comprise a water container with an electric heating  
element at the base and a sensor means for determining the temperature of the  
10 water, usually indirectly, that is without direct contact between the sensor and  
the water. Such means may comprise a bi-metallic element the operative part  
of which is in communication with the interior of the container usually through a  
vent in the container wall whereby vapour from the water being heated passes  
through the vent to activate the sensor. The sensor activation temperature point  
15 in combination with the aperture dimension is selected to switch-off the electric  
supply at or soon after boiling of the water.

With some beverages use of water at or near boiling has a detrimental  
effect on the quality. This is particularly true of so-called "instant coffee".

It is an object of this invention to provide an electric kettle wherein the  
20 automatic switch is selectively operable at two or more temperatures.

According to a first aspect of this invention there is provided an electric  
kettle comprising a container for water, an electric heating element in the base  
of the container, and a switch to selectively energise or de-energise the heating  
element, the switch including a temperature sensing device in communication  
25 with the head space in the container through an aperture whereby the



temperature responsive device is activated to de-energise the heating element through the temperature of the water vapour passing through the aperture, wherein two or more temperature responsive devices are provided responsive to different temperatures.

5 In this arrangement a common aperture is preferably used to communicate with the temperature responsive devices of which two are preferably provided.

According to a second aspect of this invention there is provided an electric kettle comprising a container for water, an electric heating element in  
10 the base of the container, and a switch to selectively energise or de-energise the heating element, the switch including a temperature sensing device in communication with the head space in the container through an aperture whereby the temperature responsive device is activated to de-energise the heating element through the temperature of the water vapour passing through  
15 the aperture, wherein the aperture size is selectable between at least two dimensions whereby the temperature responsive device is responsive to two or more different temperatures.

In this arrangement two different size apertures may be included on a slider plate which is operated to select the required temperature.

20 According to a third aspect of this invention there is provided an electric kettle comprising a container for water, an electric heating element in the base of the container, and a switch to selectively energise or de-energise the heating element, the switch including a temperature sensing device in communication with the head space in the container through an aperture whereby the  
25 temperature responsive device is activated to de-energise the heating element

through the temperature of the water vapour passing through the aperture, wherein the aperture size is variable between two dimensions whereby the temperature responsive device is responsive to two or more different temperatures.

5           In this arrangement the aperture may have a variable size which is set according to the temperature required

                  According to a fourth aspect of this invention there is provided an electric kettle comprising a container for water, an electric heating element in the base of the container, and a switch to selectively energise or de-energise  
10   the heating element, the switch including a temperature sensing device in communication with the head space in the container through an aperture whereby the temperature responsive device is activated to de-energise the heating element through the temperature of the water vapour passing through the aperture, wherein the temperature responsive device is adjustable to  
15   provide response to two or more different temperatures.

          In this arrangement the temperature sensing device itself may be adjustable to select the required operating temperature.

          This invention is now described in more detail with reference to the drawings showing embodiments according to the various aspects of this  
20   invention. In the drawings:

- |             |   |
|-------------|---|
| Fig. 1      | shows in side view and part sectioned an electric kettle according to a first embodiment of this invention, |
| Fig. 2      | shows the kettle of Fig. 1 viewed in direction A,   |
| Fig. 3      | shows a detail of the switch device of the kettle of Fig. 1,  |
| 25   Fig. 4 | shows an electric kettle as in Fig. 1 but of a second   |

embodiment of this invention,

Fig. 5 shows the kettle of Fig. 4 viewed in the direction B,

Fig. 6 shows a detail of a two position aperture plate,

Fig. 7 shows a detail of a variable aperture plate,

5 Figs. 8-12 show a modification of the embodiment shown in Figs.4-7,

Figs. 13-16 show a further modification of the embodiment shown in  
Figs. 8-12,

Fig. 17 shows multi-temperature arrangement, and

Figs. 18 & 19 show a rocking two position aperture plate.

10 In all the drawings like reference numerals designate like functional  
parts.

Referring to Figs. 1 to 3 a conventional kettle comprises a container 1 for  
water with an electric heating element 2 at the base 3 of the kettle. The  
element 2 is connected to an electric supply through two pairs of switch  
15 contacts 4 (double pole switch) shown "off" in Fig. 1 and "on" in Fig. 3. A toggle  
arrangement 5 and rocker arm 6 couples the switches 4 such that by rotating  
arm 6 about pivot 6a the contacts 4 are made (Fig. 3). Button 7 is thus caused  
to protrude and if pushed-in will switch-off the element as shown in Fig. 1.

Associated with the rocker arm 6 are two separate activating arms 8 and 9 each  
20 with a button 10 and 11. Each arm 8 and 9 has a separate bi-metallic element  
12 and 13 in communication with the interior head-space 14 of container 1 via  
an aperture 15. The button 10 sets the bi-metallic mechanism 12 for "hot" and  
the mechanism then trips at a lower temperature. The button 11 sets the bi-  
metallic mechanism 13 for "boil" and the mechanism then trips at the higher  
25 temperature corresponding to boiling of the water.

With this arrangement a user may select either "boil" or "hot" according to need.

In Figs. 5 to 7 the construction is basically similar but here only one bi-metallic mechanism 12 is used to effect the switching and the selection of the temperature is achieved by means of a plate 16 which may have two different sized apertures 16a, 16b as shown in Fig. 6 or a variable width single aperture 6c as shown in Fig. 7. These apertures perform the same function as aperture 15 of Figs 1 to 3 but by sliding the plate 16 across the vent 15 the bi-metallic mechanism is made to operate at different temperature of the water in the container 1 by virtue of the greater or lesser passage allowed for heat carrying vapour passing through the vent. The aperture 16a permits the water to reach a higher temperature than the larger aperture 16b.

In a modification the aperture may be variable as in Fig. 7 giving selective adjustment according to the position of the slider 16a. An iris diaphragm may be used with rotational adjustment calibrated according to temperature. The plate 16a may be replaced by a wheel arrangement.

In another arrangement two plates are used each with respective sets of apertures whereby one plate slides over the other. Where the apertures have different pitches an effect similar to that of a "vernier" adjustment is achieved.

Another arrangement (not shown) embodies an adjustable bi-metallic device to achieve a variation in the temperature of the water at which the switch operates.

Referring to Figs. 8 to 10 this arrangement is similar to that of Figs. 4 to 7 but includes separate "hot" and "boil" buttons either of which operates the bi-metallic element and also sets the activation temperature through displacement

of a plate. Pressing either the "hot" button 10 or the "boil" button 11 sets the bi-metallic element 12 and switches on the power as well as deflecting aperture plate 16 in one direction or another through angled surfaces 16a. This aligns either apertures 16b in plate 16 with apertures 16c as in Fig 11 or one aperture  
 5 16b with smaller aperture 16d as in Fig. 10. In the "off" position set by pressing button 7 both buttons 10 and 11 are raised and the power switched-off through switch arm 8a. In this version pressing a button 10 or 11 switches the kettle "on" and selectively sets the aperture dimension to the temperature required.

Figs. 13 to 16 show an arrangement similar to Figs 8 to 12 but using a  
 10 shield plate 50 pivoted on a ball joint 51 and which may thus rock to select either switch 10 or 11 or 7. An aperture plate 16 similar to that of the previous embodiment is used.

Figs 18 and 19 show a further form of aperture plate 16 this being rotary about pivot 16e and with a large aperture 16f and a smaller aperture 16g.  
 15 These apertures are selectively aligned with aperture 15 through buttons 10 and 11 acting, when pressed, to deflect the plate 16 one way or another about the pivot 16e.

Fig 17 shows a further arrangement using a rotary plate 16 giving multi-temperature adjustment by selectively bringing one of a series of apertures 16h  
 20 of different sizes into alignment with the aperture 15.

**CLAIMS:**

1. An electric kettle comprising a container for water, an electric heating element in the base of the container, and a switch to selectively energise or de-energise the heating element, the switch including a temperature sensing  
5 device in communication with the head space in the container through a vent formed by an aperture whereby the temperature responsive device is activated to de-energise the heating element through the temperature of the water vapour passing through the aperture, wherein two or more temperature responsive devices are provided responsive to different temperatures.
- 10 2. An electric kettle in accordance with claim 1, wherein a common aperture is used to communicate with two temperature responsive devices.
3. An electric kettle in accordance with claim 1, wherein the element is connected to an electric supply through two pairs of switch contacts , a toggle arrangement with a rocker arm coupling the switches such that by rotating the  
15 arm about a pivot one or other of the contacts are made, two separate activating arms being associated with the rocker arm each with a button, each arm having a separate bi-metallic mechanism forming the temperature responsive device and in communication with the interior head-space of the container through the aperture, one button setting one bi-metallic mechanism  
20 for a lower temperature, the other button setting the other bi-metallic mechanism for a higher temperature.
4. A modification of the electric kettle in accordance with claim 1, wherein the aperture size is selectable from at least two dimensions and wherein a single temperature responsive device is provided which is thus responsive to

two or more different temperatures according to the dimension selected.

5. An electric kettle in accordance with claim 4, wherein two different size apertures are provided on a sliding plate which is operated to select the required temperature.

5 6. An electric kettle in accordance with claim 4, wherein the aperture size is variable by adjustment between two dimensions whereby the temperature responsive device is responsive to variable temperatures.

7. An electric kettle in accordance with claim 4, wherein the aperture has a continuously adjustable size which is set according to the temperature required.

10 8. An electric kettle in accordance with claim 4, wherein a single bi-metallic mechanism forms the temperature responsive device to effect the switching, the selection of the temperature being effected by means of a sliding plate having two different sized apertures or a variable width single aperture, the plate sliding across the vent whereby the bi-metallic mechanism operates at  
15 different temperatures according to the position of the aperture in the plate relative to the vent.

9. An electric kettle in accordance with claim 8, wherein the aperture in the plate is variable in size providing selective adjustment according to the position of the plate.

20 10. An electric kettle in accordance with claim 8, wherein the plate has an aperture formed by an iris diaphragm.

11. An electric kettle in accordance with claim 8, wherein the plate comprises a multi-apertured wheel arrangement.

12. An electric kettle in accordance with claim 8, wherein two plates are used each with respective sets of apertures whereby one plate slides over the other the superimposition of the apertures providing adjustment of the aperture dimension.

5        13. An electric kettle in accordance with claim 8, wherein two separate buttons are provided either of which operates the bi-metallic element and also sets one or other of the activation temperatures through displacement of the plate.

10       14. An electric kettle in accordance with claim 13, wherein pressing either button sets the bi-metallic element and switches on the kettle as well as deflecting the apertured plate in one direction or another through angled coacting surfaces on the buttons and the plate whereby one or other apertures in the plate are aligned with the vent aperture apertures.

15       15. A modification of the electric kettle in accordance with claim 1, wherein the temperature responsive device is adjustable to provide response to two or more different temperatures.

16. An electric kettle in accordance with claim 7, wherein the temperature sensing device itself is continuously adjustable to select the required operating temperature.

20       17. An electric kettle as described herein and exemplified with reference to Figs 1 to 3, or Figs. 4 to 7, or Figs 8 to 12, or Figs 13 to 16 or as modified by Figs. 17 to 19 of the drawings.





INVESTOR IN PEOPLE

Application No: GB 0220952.6  
Claims searched: 1-17

Examiner: Vaughan Phillips  
Date of search: 30 September 2002

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): H1N (NBG, NDP)

Int Cl (Ed.7): H01H

Other: Online: WPI, EPODOC

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2170956 A (STRIX) see abstract	1 at least
X	GB 2036541 A (HADEN) see switches 31, 66, Fig. 1	1 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.